Onboard Science Understanding

Rocks targeted for spectral analysis (green)

Compound Horizon Determined (red)

Layers detected in blue regions

Spectrum of Carbonate

Autonomous Science Synthesis:
e.g. <u>some</u> rocks & light layers are carbonates,
∴ rocks likely represent <u>both</u> stratigraphic units
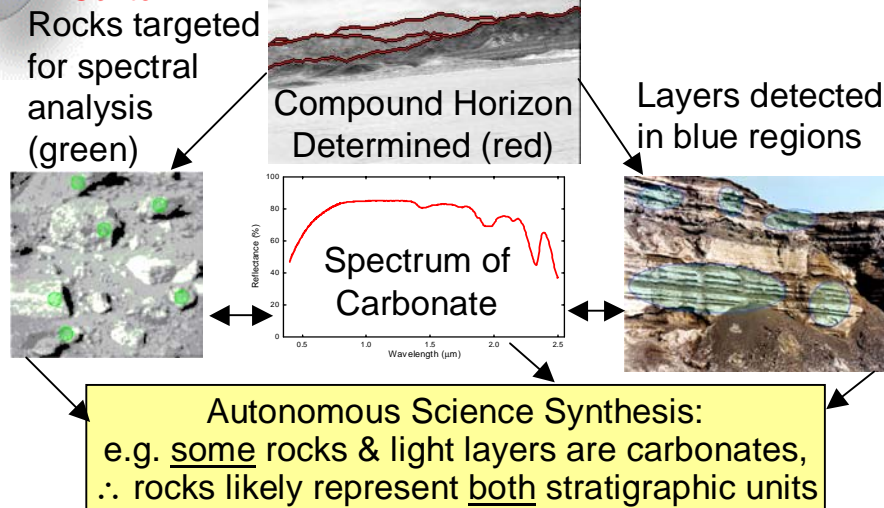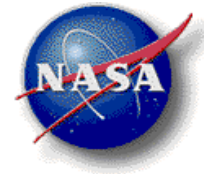
Task Purpose & Objectives

Develop fast autonomous, onboard image and spectral analyses system to enhance science data return for Mars Surveyor and future missions.

Major Products and Deliverables

- Software capable of operating within constrained computational environments
- Science Analysis prototype
- Science summarization prototype

Participants

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NASA Relevance

Enable new missions
Assure Science Data Quality
Reduce Operations Costs

Applications

Future Spacecraft, Rovers
Unmanned Aerial Vehicles

Progress FY02

- Rule-based system (RBS) extended to more minerals
- Classification of different minerals with self-organizing maps (SOM)
- Identification of other geologically significant, scale-invariant, morphological features

Plans FY03

- Test extended RBS and SOM with realistic data and in realistic environment
- Develop & test algorithms to identify other morphological features
- Implement & test Bayes classifier for spectral analysis & geologic mapping
- Evaluate application of algorithms for airborne platforms

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